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Specification

The invention relates to a sensor for detecting the presence of persons, especially for vehicle seats, having two two-dimensional flexible electrodes and one dielectric disposed between the electrodes.

From German Patent DE 43 01 000 C2, a capacitive sensor for detecting the presence of persons is already known, which comprises a sensor electrode, a middle electrode, and a ground electrode. The sensor detects the presence of a passenger from the change in capacitance between the sensor electrode and the ground electrode (vehicle body). The middle electrode here serves to keep the side of the sensor electrode remote from the passenger free of magnetic fields.

From German Patent DE 44 17 827 C2 and German Patent Disclosure DE 41 10 936 A1, capacitive sensors are known that detect the presence of a passenger from the change in capacitance between two electrodes that are built in two-dimensionally side by side into the seat or at an angle to one another in the seat and backrest.

In the known sensors, that the change in capacitance is caused by the passenger as a dielectric. This is why the electrodes must be built into the seat near the surface; otherwise the increase in capacitance caused by the human body is reduced sharply, as is accordingly the sensitivity of the sensor.

Another disadvantage is that the sensors in the last

two references named above cannot function in the presence of a seat heater. In the sensor of the first reference named above, the seat heater must be installed under the middle electrode, so that once again its effect would be made considerably worse.

The object of the invention is to disclose a sensor for detecting the presence of persons, especially for vehicle seats, that enables or does not hinder the simultaneous function of a seat heater.

This object is attained according to the invention in that the electrodes are disposed one above the other, and the dielectric is likewise embodied as two-dimensional and flexible as well as elastically compressible.

From the pressure load exerted by a passenger, the spacing between the electrodes changes and thus the capacitance of the capacitor formed by the electrodes changes. This change in capacitance can be detected and evaluated by an evaluation circuit, for instance for switching on a seat heater, for warning that a passenger has not buckled his seat belt, or the like. The sensor can easily be installed at a lower point in the seat and/or its backrest, where it does not hinder the effect of a seat heater, which should be disposed as close as possible to the surface of the seat or the backrest. The sensor according to the invention can be constructed economically and is capable of withstanding strong mechanical loads.

The dielectric preferably comprises a nonwoven or woven fabric, knitted fabric, or an elastic plastic; the electrodes preferably comprise a metallized film, or an electrically conductive textile.

A metallized film can be provided with slits or holes or can be embodied in meandering or fingerlike form. This makes the film permeable to air and water vapor. Also this makes a certain stretchability and hence long-term stability of the sensor possible.

The film can be insulated on one or both sides, and the insulation is interrupted at the contacting point. The contacting can be realized by means of a rivet introduced into the associated electrode or by means of a clamp that with its teeth pierces the associated electrode.

Since textiles acting as a dielectric can accumulate water, which changes the capacitance, the sensor is preferably installed between water-repellent textile or welded into film, so that no moisture can get in between the electrodes.

The accompanying drawing shows one exemplary embodiment of the sensor of the invention in a schematic section.

On each of the two sides of what in this case is a two-layer, compressible substrate material, there is one electrode 2 each, and each electrode is covered on the side remote from the substrate material 1 by a surface textile 3.